ITS Customer Driven Technology
Information Technology Services

Wireless Services Weekly

August 24, 2005

Quality of State Microwave Network

By Floyd Ritter, Strategic Network Planner

Monroe Peak Microwave

Recently, I have heard 2nd hand accusations that the State microwave network is a 'Cadillac' compared to the University of Utah's microwave network. I would like to say this statement is correct, and there are reasons for that. The University network is primarily for educational connectivity, and can tolerate network down-time. It is not predicated on the protection of life and property for the citizens of this state as is the Public Safety network. If the University's microwave network fails and is down for a day or longer, education on the local levels continues and there is no major impact to the state or community.

The State microwave network on the other hand, provides connectivity for 911 Public Safety Access Points (PSAP's) to their radio communications systems for first responders (Fire, Police, EMS, etc.), when responding to calls from the public in the protection of life and property. These systems in many cases are located on remote mountain tops -void of any commercial carrier services, and relying on the microwave for connectivity and control. Public Safety agencies depend on their communications network to provide adequate response to the citizens of this State. It is our number one priority to provide Public Safety that communication.

To accomplish this, the state microwave and radio network must be designed to meet the needs of Public Safety, (little or no down time). The State microwave system has been designed and implemented for network failsafe reliability in the event of a normal outage, a disaster or other disruption that could effect normal business operations for Public Safety. The State microwave network has been installed with the following parameters to meet the needs of the Public Safety community:

1. **Monitored Hot Standby**
   All critical microwave paths are implemented using monitored hot standby, or monitored hot standby with space diversity antennas where required to meet the path reliability standards of 99.9995% availability. This provides redundant transmitters and receivers. Should either fail, the system will automatically transfer to the standby, continuing to operate while sending an alarm to the network management system (redundant at the State Office and Richfield Alternate Site) that a failure has occurred, at which time an on-call technician is notified of the failure.

2. **Spares**
   Recommended spare equipment for microwave and related equipment are maintained by the technical support team, so that any failure can be repaired and put back into a full hot standby mode as quickly as possible while the failed equipment is returned for repair. The repaired equipment will then be put back into the spares inventory stock.

3. **Back-up Power**
   All sites are equipped with standby generators capable of handling the site telecommunications load, should the commercial power fail. If power fails, the alarm system will alert the two network centers that the power has failed and the generator has started. The sites contain ample fuel to operate for at least ten days. The generators are cycled weekly to ensure operational integrity is maintained.

4. **Battery Power**
   All microwave equipment operates on -48 Volt batteries that are sized for individual site requirements to sustain operation for a minimum of twenty-four hours on remote sites, and twelve hours in city locations should the generator not start. The alarm system will also notify the two network centers that a failure has occurred. The battery charges also utilize redundant components to ensure field personnel can respond and correct the problem prior to any failures.

5. **Quality Staff**
   A very reliable and highly qualified technical staff is available and on-call twenty four hours, seven days a week with four wheel drive vehicles, snowcats, test equipment, two-way radios, pagers, cell phones, computers, etc. The least experienced microwave technician has had more than 20 years of experience on the team.

6. **Vendor Response**
   The technical support staffs maintain 1-800 numbers for all vendor equipment supported that maintain twenty-four hour, seven-day-a-week support service to help in problems that are not easily identified. Vendors have agreed in writing to support the state with equipment or services should a major disaster occur requiring additional support.

7. **Site Standards**
   All equipment at the microwave sites is installed and maintained to the highest standards in the industry. We follow Motorola's R-56 Site Standards as a guideline to ensure proper grounding, lightning protection, power quality, surge suppression, earthquake resistance, and many other site aspects are well engineered.

8. **Alarm System**
   An alarm and network management system is installed at the State Office Building with a redundant system in the Richfield Alternate site. The alarm system monitors all microwave, batteries, battery chargers, generators, AC power, room temperature, and many other site functions. Any status change is established as an alarm in both centers.

The State support personnel, in partnership with the vendors that support the state microwave and radio systems, are prepared to respond expeditiously to day-to-day outages as well as any disaster, with pride and confidence. Public safety agencies can not deal with down time of the communications network, and we intend to make sure they don't have to.

Direct and Remote Sensing

By Boyd Webb, Strategic Network Planner

The future success and viability of any given technology can be predicted in a variety of ways; but the rate at which a technology evolves, over time, is likely the best indicator. This being said, it is hard to imagine how any technology could progress more rapidly than the technologies behind direct and remote sensing within the past five years. The sudden attack against the World Trade Center, on September 11, 2001, changed our collective expectation with respect to remote sensing. Technologies once used primarily for air quality and other environmental status reporting quickly became a priority for security operations. Government leaders also like the fact that direct and

remote sensing technology provides for greater individual security without unduly compromising personal freedoms.

Current technologies involved in direct and remote sensing include the following:

RFID – Radio Frequency Identification is a wireless information technology that facilitates data storage and retrieval in a controlled field environment. RFID is primarily used to track inventory, animals, and people. Low Frequency RFID tags operate at 125 and 134.2 kHz and are primarily used to track animals. More recently developed RFID tags operate in the 300 MHz, 2.4 GHz, and 5.8 GHz bands. RFID is widely used in national security operations that employ direct and remote sensing technologies. (http://en.wikipedia.org/wiki/RFID)

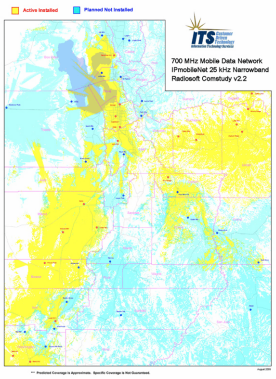
mmWave - Millimeter Wave Sensors operate in the 20 – 150 GHz spectrum. The ability of RF energy in this frequency range to pass through some material while reflecting off other specific material makes mmWave sensors very accurate in determining potential hazards remotely. The detection of explosive material, dangerous chemicals, and illegal drugs can be made through walls and inside sealed containers using mmWave wireless sensors. (http://www.techtransfer.anl.gov/techtour/mmwave.html)

HRRS - High Resolution Radiation Sensors are used to detect and monitor nuclear materials in transit. Passive screening in combination with active neutron interrogation technologies are used in Washington DC and other potential high profile targets in the United States. (http://www.llnl.gov/tid/lof/documents/pdf/244044.pdf#search='nuclear%20material%20detection')

Mobile Data Update

By Doug Chandler

As of last week, Frisco Peak and Reservoir Hill are the latest mobile data sites to be brought on-line. For the first time since we started deploying the network, we are getting devices faster than we can deploy them -both mobile and base stations.



Click to See Current Coverage Map

The mobile data project is truly a groundbreaking effort in that 'radio people' and 'network people' have had to work together in new and innovative ways. We put together a rather eclectic project team that includes members from the WAN Planning Group, Network Operations, and Product and Project Management. Most products that ITS hosts can be 'owned' by individual groups for the most part. Mobile Data is the first product of it's kind, in that it could have never been planned, installed, or maintained without highly synergistic efforts from multiple disciplines.

ITS Customer Support

The customers that are now on-line have been experiencing very satisfactory results. The problems that our customers have experienced so far have each been addressed to their satisfaction, while providing learning opportunities to us as we navigate this new frontier. Every time we run across a new problem, we learn from, and mitigate it. Responses to outages have, in themselves, been a learning experience. Does the Help Desk call out a radio tech or operations person? As we iron out response issues, I am thankful to work with professionals who take ownership of issues without responding to the temptation of finger pointing.

A 'Radiant' Personality

By Travis Sylvester, Radar Tech

I have been working as a police radar and laser technician for the better part of ten years now, and I thought I had seen or heard about everything when it comes to individuals trying to get out of speeding tickets. That is, until a very interesting gentleman came in to my office some time ago. I am used to the phone calls from guys posing as attorneys, and even somewhat entertained by my favorite: the self proclaimed police radar expert who Googled "how to beat a speeding ticket", but I was not prepared for the individual I was to meet that day.

I recall looking up from the project I was working on to see a thin, middle-aged man with a particularly shiny head. He asked me if he could ask me a few questions and a favor as well. I told him certainly, and gave him my full attention. He informed me that he was a truck driver, and in the last few months he has received several speeding tickets, and that his job was in jeopardy due to the speeding violations. He informed me that his truck had a governor, or speed limiter, installed to prevent the big rig from exceeding 75 mph or so. He continued to tell me that all of his citations were for going approximately 85 mph (give or take a few), and that it was impossible for him to be going that fast since the installed device would not permit it.

Here comes the part that threw me. It was his theory that "he" was the cause for the extra 10 mph. He believed that his body was "radiating" and causing the radar guns to read 10-15 mph high! At this point, I was trying not to laugh (trying real hard I must say), and handle the situation in the most professional way that I could. He then asked me if I could prove his theory and point a radar gun at him and see if it reads any speeds. At this point, I casually started looking for the hidden camera and microphones (yes, the guys at the Salt Lake radio shop are indeed this creative as well as devious, just ask Doug about the 100 Watt siren speaker that was mounted under his desk).

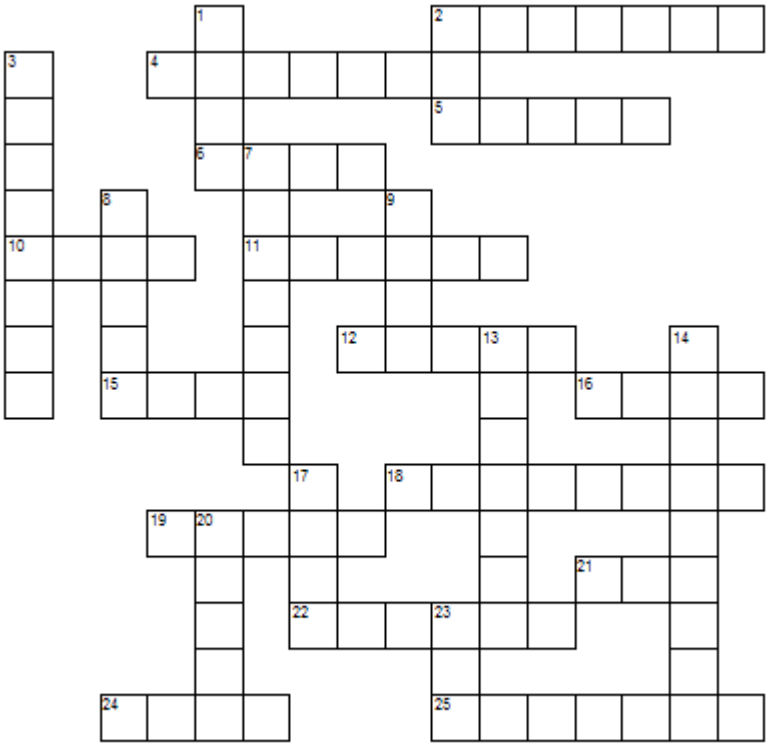
I figured I would oblige his wish since he seemed sincere and genuine with his concerns. I proceeded to plug in a hand held radar, turn it on, perform the internal test, showing him that it was accurate, then I pointed the radar at him and tried my best to get a reading. I tried several times from various distances and angles with no luck (all with only a *semi* straight face at this point). Then he asked me to aim it at his face, because...well obviously, that is pretty much all that is exposed while behind the wheel of the truck. Duh, why didn't I think of that initially! That is when I started to lose it a little. Still no reading, so he bent his head down as if looking for something on the ground, feverishly moving it from left to right as he asked: "anything, anything? How 'bout now? Anything at all?"

Ok, I am only human. I lost it for a minute, who wouldn't of? Here I am, aiming a radar at the top of a guys bald head while he moves it from side to side as if he were watching a tennis match in fast forward. Needless to say, we concluded that he didn't have a "radiant" personality, but rather just a heavy foot or faulty speed regulator. If the radar would have produced a speed, and this went to court, local law enforcement would have their hands full of people with 15 mph 'aura's'!

Telecom Crossword

By Doug Chandler

You can print this page, or solve it on-line at: http://www.mycrosswords.com/210/DougChandler/Untitled.html



Across

2 PDA: Personal _____ Assistant
4 'Access point' location for wireless broadband
5 _____ Phone: PDA/Phone Combo
6 A facility that answers 911 calls (acronym)
10 A real winter problem on mountaintop radio sites
11 MPEG: _____ Pictures Experts Group
12 IEEE 802.16 Standard
15 TDMA: _____ Division Multiple Access
16 LAN Authentication Protocol for 802.11 (Acronym)
18 Utah's new Chief Information Officer
19 Communications 'over the air'
21 Subscriber service to your home via copper wires
22 GSM: ___ System for Mobile Communication
24 DHCP: Domain ____ Control Protocol
25 Protector of our state highways

Down

1 Standard for transporting voice over the Internet (Acronym)
2 New state technology department (acronym)
3 The 'queen' of state dispatch centers
7 Transmission in one direction
8 JPEG: _____ Photographic Expert Group
9 Any type of 802.11 network (Acronym)
13 Conductor used for radiating or receiving radio energy
14 Service virtually anywhere on the planet
17 Packet Internet Groper test used to verify internet link quality
20 An alternative identification string for an IP address
23 Binary digit

Answers on last page

Calendar

UWIN Technology Steering Committee
10:00am - Noon
Friday September 9, 2005
Rampton Complex
4501 South 2700 West
UHP Large Conference Room

911 Committee
Thursday September 15, 2005
10:00am - Noon
Rampton Complex
4501 South 2700 West
UHP Large Conference Room

UWIN Governance Board Meeting
10:00 am - noon
Friday September 16, 2005
State Office Building, room 5112

UCAN Board Meeting
Tuesday September 20, 2005
2:00 - 4:00 pm
VECC
5360 South 5885 West
Salt Lake City

Utah Sheriff's Association 10th Annual Conference and Exposition
St. George Dixie Center
September 11-13
Conference Link

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